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ABSTRACT

An instructional program that teaches decoding skills to learning disabled children was developed to serve as a supplement to whatever reading program is used in the classroom. As a result of task analysis, the program's instructional sequence begins with auditory tasks analyzing syllables and short words into phonemes, then blending these phonemes into syllables and words. Once proficiency in these tasks is observed, decoding is taught. The program is designed to be cost-effective; it does not require the same amount of support (funds and trained personnel) that reading programs in normal school situations require. (Discussion following presentation of the paper is included.) (BL)

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The ABD's of Reading:

A Program for the Learning-Disabled

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This paper describes an instructional program designed to teach decoding skills to learning-disabled children. It was developed to serve as a supplement to whatever reading program is used in the classroom, and it will probaoly be most useful as remedial instruction.

OVERVIEW

The first part of The ABD's of Reading focuses solely on auditory tasks. Children learn to analyze syllables and short words into phonemes and then to blend phonemes into syllables and words. Only after proficiency in these tasks is reached are letters introduced, first in the context of individual letter-sound correspondences. Then, decoding is taught.

This instructional sequence represents the outcome of a task analysis. In this approach, the final criterion task is analyzed into simpler component skills, which are then taught both separately and in integration with other component skills before the complex criterion skill is presented (Gagné, 1974; Glaser, 1977). The basic psychological processes--attention, memory, and so on--that are involved in the mastery of the tasks must also be identified and considered in the instructional design (Resnick and Beck, 1976). This approach is well-documented and rather widely accepted at the present time, and it needs no discussion here.

One major difference between this program and other programs that teach beginning decoding skills is that, at the very beginning of instruction, certain component tasks are introduced that are not usually taught in isolation: auditory analysis and auditory blending. Classroom observation and a review of the literature led us to the conclusion that a sharper focus on these particular auditory skills than provided elsewhere would be

of value to the learning-disabled child--a population not often considered explicitly until recently.

It should be noted that our goal is to develop a product that will be useful in the normal school situation. Classes of learning-disabled children usually contain fewer pupils than do regular classrooms; but this still means at least eight or ten children per class, and these are children who are hyperactive, distractable or otherwise difficult to manage. They are not often able to work independently. Many learning-disabled classrooms are staffed by a teacher and a teacher's aide, but one cannot count on this; recent budget cuts have resulted in the elimination of many aides. Because we were concerned about cost-effectiveness, we decided not to work toward individualized instruction, even though that is highly effective. We chose to develop materials suitable for small group instruction. Much of the instruction in learning-disabled classrooms is of that type, and it appears to work well in terms of both instruction and classroom management. We did not assume the availability of an aide to help instruct. We also have kept the materials themselves as inexpensive as possible consonant with actual instructional requirements. For example, color cues are not used because full color production is so expensive.

We had another aim in addition to achieving cost-effectiveness: to develop a set of materials that teachers would accept and use. We rejected the necessity of any extensive "selling" of a point of view or even extensive teacher-training procedures. We also rejected the notion that teachers should spend a large amount of time preparing lessons. No matter how enthusiastic teachers may be about an instructional approach, they

simply do not have the time to do elaborate preparation for class. We have developed a program which is complete and self-contained. Teachers can pick it up at the place where they left off and continue without previous preparation. Moreover, while a teacher is working with a small group of children, he/she should concentrate totally on his/her instruction. Thus we provide word lists, examples, etc. so that the teacher is not distracted from the performance of his/her pupils.

The goal, then, is not to develop a program that is effective during development and evaluation when there is a large amount of support (funds and trained personnel) available. Rather, our goal is to develop a program that can stand by itself, without such resources, for in the normal school situation there are no such supports.

THE LEARNING-DISABLED CHILD

There are many children who cannot make progress in a regular school situation even though they presumably have the intellectual capacity to do so. Nor do they have physical handicaps, emotional problems, or sensory loss; nor have they suffered any educational or cultural deprivation. In other words, they appear to have potential for achievement but nevertheless do not demonstrate adequate achievement. Until only recently, such children were often characterized in terms of "brain-injury" or "minimal cerebral dysfunction". The notion that the difficulty was due to some sort of damage to the central nervous system (Strauss and Lehtinen, 1947) rarely could be corroborated with actual evidence of neurological impairment. The newer term "learning-disability" acknowledges the fact that we do not know the reason for these children's difficulties.

These children may demonstrate any of a wide variety of problems. They

may show poor performance in several school subjects, or they may demonstrate more specific disability in only one area, such as reading. Their aptitude test scores are likely to show uneven performance among subtests with a substantial difference between verbal and performance abilities. They may be impaired in one or several of the following areas: perception, conceptualization, language, memory and control of attention, impulse, or motor function (Hallahan and Kauffman, 1976). Ross (1976) considers that a basic problem shared by many if not all learning-disabled children is a difficulty in sustaining selective attention. It is this difficulty, he claims, that leads to other problems characteristic of this type of child--perseveration, distractability, and poor memory, which in turn lead to inadequate school performance.

Although not all learning-disabled children have trouble learning to read, this area does represent an important source of difficulty for many of them. Disabled readers are themselves not easily categorized; they may have difficulty in any or all of the areas on which reading is based. They may exhibit disorders in visual and auditory discrimination, or memory and sequencing, as well as in the integration of auditory and visual perception (Samuels, 1973). Vellutino (1974) has discussed the myriad patterns of error on reading tasks that occur: reversals and transpositions, adding or dropping of phonemes or syllables, substituting one word for another with a similar meaning, confusing similar letter sounds, and/or inability to blend and analyze word parts. These are the same mistakes, or course, that any beginning reader might make; but the normally-achieving child eventually ceases to make them, whereas the disabled reader persists.

It is certainly unrealistic to expect that one particular teaching

approach or one specific set of instructional materials will be maximally effective with the wide variety of children classified as "learning-disabled" or even as "reading-disabled". It seems likely that some further differentiation of types of children within this overall classification will have to be made before we can confidently make judgments about the specific educational approach to take with an individual child. Indeed, a great deal of research has been done with just this goal in mind. Not too much progress has been made, unfortunately. It is not easy to find instances in which one instructional method is superior to another for one group of children and a second is superior to the first for another group of children (Cronbach and Snow, 1977).

Most of the search for such disordinal interactions in the area of reading instruction has focused on the issue of modality. That is, attempts have been made to characterize children as either "eye oriented" (they have trouble with tasks involving auditory analysis) or "ear oriented" (they have trouble with visual perceptual tasks). Wepman (1968), for example, proposed that all early learning is modality-bound and that some children have a discrepancy in the ease with which they can process and store information received through the eyes and ears. There is, however, no sound empirical foundation for the notion that different reading approaches are differentially effective for children characterized in these ways. Most studies have compared some variety of whole word approach, which requires little analysis of sounds, with a phonics approach. Neither classroom studies (Bateman, 1968; Robinson, 1972) nor laboratory analogues (Bruninks, 1970 ; Ringler and Smith, 1973) have come up with convincing findings. It should also be pointed out that in these studies children identified as

visiles and audiles together comprise only about 15 - 20% of the sample.

It would probably be unwise to argue that matching instructional treatment to diagnostic category will never be shown to enhance learning. It may even be true that there are special methods of teaching reading which will work most effectively with specific types of children. But we have no evidence now, and to develop curriculum materials with such a focus at the present time is not reasonable.

THE PROGRAM RATIONALE

Slow learners, including the learning-disabled, need simple, clear and direct instruction. They do well with a structured approach, and the material should be presented at a slow pace with each step made carefully explicit and with sufficient opportunity for practice. They should be active participants in the instructional process, and ample feedback should be provided about their performance. They should be kept motivated to achieve. These general principles need not be defended here (although I will say, parenthetically, that the effective implementation of these principles is not always easy!).

Decoding is the central task of beginning reading instruction. It consists of learning the fundamental relationships between spoken language and written language, i.e., the mapping of the grapheme-phoneme correspondences. The ability to decode, then, implies both the ability to isolate the phonemes that make up a word and the ability to blend individual phonemes into whole words. The development of these abilities requires the use of complex conceptual strategies (Vernon, 1957; Resnick and Beck, 1976).

In the whole-word (sight) method of instruction, and to some extent in linguistics methods, there is no direct instruction in analysis of a word

or word part into its component sounds. Not all children can do this inductive analysis on their own; some children will succeed with this type of instruction while others will not. Those who do not succeed often do not make much progress in reading, because for them, this sort of instruction requires rote-learning of a large number of specific words and letter patterns, and there is, after all, a limit to one's rote memory. Moreover, Liberman et al. (1967) have shown that the acoustic characteristics of a phoneme are modified by the other phonemes in a word or syllable and that the cues for recognizing the phonemes in a word occur simultaneously as well as sequentially. Thus, the component sounds of a word as we sound it out (e.g., "c-a-t") are not actually segments of the spoken word; blending is an abstraction. For these reasons, the desirability of giving direct, explicit instruction in analysis and blending to the learning-disabled child seemed obvious to us.

It is clear that progress in beginning reading is related to proficiency in those auditory skills that can be identified as components of the decoding process. Much of the literature is based on correlational evidence, to be sure. Monroe (1932), for example, found significant differences between children with reading disabilities and younger controls in both auditory discrimination and the acquisition of auditory-visual associations. Relationships between a variety of auditory tasks and reading readiness or first and second grade reading achievement have been demonstrated over and over again (e.g., Harrington and Durrell, 1955; Dykstra, 1966). More recently, the importance of the specific abilities of blending and segmentation has also been emphasized (Elkonin, 1963; MacGinitie, 1967). Substantial correlations have been found between these tasks and either

concurrent or later reading achievement (e.g., by Chall, Roswell and Blumenthal, 1963; Calfee, Lindamood and Lindamood, 1973; Liberman, 1973).

Moreover, there have been several studies showing that training in auditory skills may have positive effects on reading. Durrell and Murphy (1953), evaluating the results of eleven studies, concluded that training children to notice sounds in words improved their reading scores. Children whose initial scores were very low made the greatest progress. This training, incidentally, consisted only of identification of initial consonants and of rhymes. Elkonin (1963) taught kindergarten children to identify sounds in words by using counters to represent each phoneme. Rosner's (1973, 1974) instructional program, which develops word analysis skills to a high level of proficiency, shows some transfer of these skills to the reading task.

Since our work on this program began, more and more studies have corroborated this point of view. Helfgott (1975) found that kindergartners' segmentation ability predicted reading achievement one year later. Goldstein's (1976) findings were similar; he concluded that reading instruction was much less effective if a child's ability in sound analysis and synthesis was very low. Fox and Routh (1976) found that phonic blending training was effective only if children were already proficient in phonic analysis (however, it is possible that the children who at the beginning of their study were superior in ability to analyze words into phonemes were generally more able students).

All of this evidence suggested that a highly-structured program with emphasis on the development of auditory skills would prove successful. Underlying this was the fact that auditory deficits do seem to be more

characteristic of learning-disabled children than are visual or inter-sensory problems (Zigmond, 1969)--difficulties in auditory discrimination, memory, sequencing ability and, especially, analysis and synthesis.

For most children, it would not be necessary to introduce the segmentation and blending tasks as purely auditory tasks; letters could be introduced at the same time. But we introduced them separately in order to simplify the task; we considered this important for learning-disabled children. Many learning-disabled children have failed to learn to read simply because they cannot handle the complexity of the task as it is usually presented. That is, they suffer from "sensory overload". Or they may have failed simply because of the lack of explicit emphasis on the auditory components of the task and extensive enough practice on these skills.

Several points should be noted here. First, all the studies that I have cited are concerned with auditory tasks that involve language and that are therefore closely related to reading. Second, the literature is convincing on the specificity of transfer and the dangers of relying on transfer in instruction (Williams, 1975; Gage and Berliner, 1975). Third, the results of the formerly popular visual-perceptual-motor reading-readiness programs (e.g., Kephart, 1960 and Frostig and Horne, 1964) have turned out to be very disappointing. These facts should serve as a clear warning that "auditory perceptual training" in and of itself will not improve reading achievement (the plethora of recently and hastily developed programs of this type notwithstanding). It is the emphasis on effective presentation of the auditory components of the reading task itself that is important.

Of course, the "need" for a particular instructional approach and the demand for it are not determined solely by evidence from research. The Zeitgeist has to be right. The field of linguistics has had a major impact on educational thinking over the last decade or two, and the consequent reaffirmation of the idea that "reading is a language skill" has helped to foster the current emphasis on auditory skills in beginning reading. In addition, because of the recent acknowledgment of the ineffectiveness of visual-perceptual training, the focus of many of the standard reading readiness and remedial reading methods (Williams, 1977), people have been clamoring for something new and different. It is interesting to note that in her classic book Backwardness in Reading, Vernon (1957) stressed the need for analysis of both the visual and auditory structures of words, and yet for almost twenty years most of the references to her work document the need for visual analysis and ignore the need in the auditory modality.

DESCRIPTION OF THE PROGRAM

Introduction: In a short introductory section of the program, the child learns the concept of analysis, that is, that words can be broken down into parts. Both compound words and multisyllabic words are presented. At the end of this sequence, the child can analyze at the syllable level. That is, he/she can tell what syllable occupies the initial, medial and final positions in a whole word. This is a much easier task than that of segmenting into phonemes (Liberman, Shankweiler, Fischer and Carter, 1974; Hardy, Stennitt and Smythe, 1973). Indeed, it is an extremely simple task, and this introductory section moves very quickly. In addition to demonstrating the concept of analysis, there is a second reason for beginning the program

with this material. Because the sequencing of sounds is a temporal phenomenon, it is wise (Elkonin, 1963; Kuenne and Williams, 1973) to provide some sort of visual "marker". Moveable wooden squares, which provide tactile and visual representation of sounds, are used to facilitate auditory analysis and synthesis. The child learns to identify auditorially first, middle, and last syllables (or word parts) and to associate them visually with markers. Thus this visual representation is introduced on a task that represents very little challenge to the child and is therefore accomplished easily.

Phoneme Analysis: In this section of the program, phoneme analysis is taught, again as a strictly auditory task. The squares now represent phonemes and aid in focusing on the number and the order of sounds, which has been found to be a difficult task for children (Calfee, Lindamood and Lindamood, 1973). Combinations of two phonemes are presented first, followed by combinations of three phonemes, both real words and nonsense syllables.

All of this auditory analysis and sequencing practice is done with a limited number of phonemes. In choosing the initial set of nine phonemes (and therefore, later in the program, letters), we considered the following factors: (1) avoidance of auditory confusability, (2) avoidance of visual confusability, (3) ease of blendability of the phonemes in combination, (4) productivity of phonemes in creating real-word trigrams, (5) ability of children to produce sounds, (6) ease of learning grapheme-phoneme association, and (7) regularity of phonemes in spelling patterns. Each of the seven considerations suggested a different set of "most appropriate letters", so compromises had to be made on some points. Because of the program's em-

phasis on auditory skills, we decided that visual considerations would be of relatively low priority and that avoiding auditory confusability would be our highest priority.

The short vowels (a and o) were selected because of their adherence to regular spelling rules in consonant-vowel-consonant (CVC) trigrams and secondarily because of their productivity. Long vowels, while more easily discriminable and blendable (Coleman, 1970), were ruled out because of the irregularity of long vowel spelling patterns in English. The selection of consonants proved to be at least as difficult as that of vowels. Miller and Nicely (1955) divided consonant phonemes into four basic groups; within each one there is considerable potential for confusion in discrimination whereas between groups there is little. Thus, for ease of discrimination, we chose one consonant from within each group, the one which best satisfied the requirements of (1) production of many real word trigrams, and (2) children's ability to produce the sound without error (Marsh and Sherman, 1971). The ease of sound-symbol association learning (Coleman, 1970) was also considered, and the letters chosen were acceptable in this respect. On this basis the initial set consisted of b, m, p, and s. Then in violation of several considerations, but in order to provide enough real-word trigrams for meaningful instruction, the letters c, g, and t were added. Thus the nine letters are a, o, b, m, p, s, c, g, and t.

The use of only a small number of phonemes that are chosen for maximum discriminability means that if a child moves ahead rapidly in analysis and synthesis and yet finds auditory discrimination difficult, he can still proceed in the program. Furthermore, the program may well improve his discrimination abilities as a side-effect, because it works to

increase attention to detail.

Phoneme Blending: The next section of the program presents blending of the same two-phoneme and three-phoneme (all CVC) units. The CVCs are broken at different points. Initially, only the last phoneme is separated from the rest of the word. Next, only the first phoneme is separated from the rest of the word, and later all three phonemes are presented separately. This sequence is based on work by Coleman (1970).

Letter-Sound Correspondences: After the basic instructional sequence on auditory analysis and synthesis, there is a section that teaches the letter-sound correspondences for the nine phonemes. Thus children will be thoroughly familiar with the correspondences they will need for the initial decoding section before they get to that point in the program.

Decoding: The next section of the program pulls together the auditory skills and the letter-phoneme correspondences that the child has been practicing. Here he must integrate the skills he has learned in isolation. Again using wooden squares, which now have letters on them, the child learns to decode bigrams and trigrams (both meaningful words and nonsense syllables), made up of the same nine letters with which he has already become familiar. He receives extensive practice in the manipulation of these letters so that he can decode (read) and construct from letter squares (spell) all the possible CVC combinations. Through this extensive practice with limited content, the child learns to attend to the details required for accurate decoding, and he also learns the fundamental processes and strategies that will enable him to apply decoding skills to other content.

Further Instruction: In the next section of the program, six additional letter-sound correspondences (f, h, i, l, n, and r) are introduced. Then

these are used in trigram decoding. Following this, all fifteen letters are combined and recombined for additional decoding practice.

The final section of the program introduces, one by one, more complex units for decoding. First, CCVC patterns are decoded, followed by CVCC and then CCVCC patterns. Finally, two-syllable words made up of the same basic patterns are presented.

Organization of the Program

The instruction outlined above is organized into twelve units and a total of 41 objectives. Each unit begins with a story, to be read by the teacher. This story is designed to capture the children's interest, and it incorporates a demonstration of the skills to be mastered in the unit. For example, a child must guess the "magic word" which unlocks a secret door when the magician says the word broken into phonemes. The same cast of characters--Isabel, whose nickname is Wisebell because she is a little "know-it-all", along with her friends, Tom and Mac, and Sam, the janitor--appears throughout the program in stories and games and provides a continuing theme and focus of interest.

Following the story, a teaching procedure is presented for each objective. This consists of a complete and very explicit script for the teacher along with as many appropriate examples as will be needed. The instruction always follows the same format: first the teacher demonstrates the task by modelling one example. Then he or she calls on an individual pupil, models another example, and has the child copy him/her. Then he/she presents another example which a child must do independently. Errors are corrected by the teacher's providing the proper response and then having the child repeat it immediately afterwards.

Each unit also contains a variety of materials for practice. At least one game is provided for practice on each objective. The games are simple, and there are only a few different game formats, of the sort (Go Fish, Concentration, etc.) that most children recognize. Their content varies, however. In one game, children must collect three cards, each of which represents a different after-the-movie snack; in another, three different bicycle parts. This type of variation is enough to make each game accepted as novel and interesting. Games can be played either competitively or not.

In addition, two worksheets are provided in each unit. As with the games, some of the worksheets were designed to be completed under the supervision of the teacher and others to be done independently. In actuality, however, the use of all program materials is directed by the teacher.

All of the activities are designed to provide small groups of children with the opportunity for extensive practice of skills in a variety of contexts. They also provide for continuity and interest, in that they are based on the theme of the story presented at the beginning of the unit.

Comprehension

This is a decoding program, not a complete reading program. But it is important that pupils be able to apply their decoding skills in the context of actual reading. To insure this, the teacher provides a meaningful context for words immediately after they have been decoded (or blended, earlier in the program); he/she uses the word in a sentence or identifies it as a nonsense word. In addition, simple comprehension activities are provided. For example, in the second half of the program there are several "stories",

each consisting of a series of four pictures with one or two short sentences under each picture.

A few simple words that are not easily decodable, like is, to, and of, are necessary for these comprehension activities. When the program is used remedially, it is possible that some children have enough of a sight-word vocabulary so that they can read this material on their own. In other cases, of course, this is not true, and the teacher and the pupil read the sentences together, the teacher supplying the words which do not lend themselves to a decoding strategy.

Individual Differences

It is obvious that individual differences exist in the degree to which some of these abilities are deficient and in the amount of training that will be required. The program is designed to be maximally flexible in dealing with these differences. For example, the letter-sound unit may be begun early or late; and it, or any of the units, may be extended for whatever length of time is required to attain competence. Some children may prefer competitive games, and others may achieve more readily with individual activities. Worksheets appeal to some chidren (and teachers) and are of very low interest to others. The variety of materials that are provided allows options, and the teachers (and, when feasible, the children) can choose the most effective combination of alternatives.

EVALUATION IN THE FIELD

During the past year, 1975-76, the complete program was used in the field for the first time. (Prior to this, of course, during the earlier stages of development, portions of the program had been administered to small groups of children or to one child at a time, both by staff members and by classroom teachers). The children were pupils in Health Conservation (HC-30) classrooms, which are administered by the New York City Board of Education's Bureau for the Education of the Physically Handicapped. All children in these classrooms are learning-disabled. Any emotional overlap to their disabilities is slight, since children with more severe emotional disturbances are placed in other classes. Children are assigned to these (or other) special classrooms when they perform unsuccessfully in a regular classroom setting and only after extensive psychological and neurological assessment. All classrooms were in Title I schools in Central and North Harlem and on the Lower East Side. The ages of the children ranged from seven to twelve years old.

Our main focus for the year's work was on formative questions; we were interested primarily in making further refinements to the program on the basis of observation of actual teachers using the program in their normal classroom setting. Because of this orientation, we invited teachers to work with us who had been recommended as competent and co-operative (which indeed they proved to be). In November 1975 over 150 pupils in eight schools were pretested. The pretest assessed competence in the specific skills covered in the program: auditory analysis and blending of both syllables and phonemes, letter-sound correspondences, and decoding.

On the basis of the pretest results, we selected those children, three or four from each classroom, who were most likely to profit from the program.

Seventeen instructional groups, totalling 63 children, were formed. We found that in almost every case we had chosen the same children whom the teacher had had in mind for the program.

We also administered the pretest to another group of HC-30 children in comparable school districts within Manhattan. Using the same procedure that was used to choose the instructional population, 16 groups (64 pupils) were formed (and their pretest scores did not differ from those of the instructed groups.) This is, of course, not a proper control group, but comparing these children with those who were instructed did give us some notion of the overall impact of the program. It also has provided pilot data for next year's evaluation.

Teachers were asked to use the program daily for approximately twenty minutes per session. Four teachers were observed every day. This close monitoring of instruction is especially important when working with learning-disabled children, because their behavior is often extremely erratic. The other thirteen classes were observed and the teachers interviewed once a week. Teachers were asked to work through the program exactly as it was presented, using all the games, worksheets, and so forth, so that we would have a firm basis for evaluation and possible revision. (This, of course, is not the way the program is actually to be used.) No teacher dropped out of the study, and very few children dropped out of their classes, and therefore the program, during the year.

The same test we had used as a pretest was readministered at the end

of the academic year, after over six months of instruction. Posttest scores were higher than pretest scores on every subtest for all children. The posttest scores of the instructed group were significantly higher than those of the comparison group on all of the subtests except some of those on which scores for both groups had been very high on the pretest (syllable analysis and blending, and the two easiest phoneme analysis tasks, identifying initial and identifying final phoneme). The tasks on which the instructed group showed significantly more improvement were both of the letter-sound correspondence tasks, the two more difficult phoneme analysis tasks (identifying the middle phoneme and identifying all three phonemes in CVCs), phoneme blending, and decoding. On the test of decoding, which included both real and nonsense material and both bigrams and trigrams, the posttest score of the instructed group was double that of the comparison group.

Six months later, the posttest was administered again. (Most of the these children remain in the same classroom with the same teacher for more than one year.) The instructed children's scores were still superior to those of the comparison children. However, they did not show gains on any of the subtests from their earlier posttest performance to this one.

The lack of additional improvement of the instructed children is regrettable; it is not uncommon where there is no specific attention given to planning the interface of an instructional program with subsequent instruction (as we shall do in this year's full-scale evaluation). It should also be noted that two teachers remarked that because the instructed children had gained so much in decoding skill, they were no longer spending as much time with those children on these skills!

It is premature to attempt to evaluate the effectiveness of the program, of course, but these very preliminary data do seem promising. First of all, the teachers liked using the materials - a limited criterion, to be sure, but an essential one. They felt that their children were making progress (which our data corroborated), and they also felt that the program was easy and comfortable to use. Indeed, the length of daily sessions averaged around thirty minutes instead of the twenty that we had requested.

Not all children made the same amount of progress. There were a few for whom the program was no more successful than any other procedure that their teacher had attempted. And there were a few children whose responsiveness to the instruction and mastery of decoding amazed their teachers. It seems fair to say that many of the instructed children grasped for the first time the notion that there is a one-to-one correspondence between phoneme and letter and that systematic strategies can be used to decode words. These are fundamental aspects of the reading task that are often glossed over by comprehensive code-emphasis programs, for the simple reason that most children achieve these early concepts fairly easily. Most children start to have trouble only when irregular correspondences are introduced. Several of the newer programs provide adequate instruction at this point and in the more complex aspects of decoding. However, for the slow learners with whom we are concerned, only thorough and systematic instruction in the earliest phases of the reading task, as provided by a program like this one, can prepare such children to perform adequately in the comprehensive programs.

In October and November of this year, 1976-77, we tested children in six New York City school districts in Manhattan, Brooklyn, and the Bronx.

On the basis of pretest scores, we formed 46 small groups (N=164). These groups were assigned randomly to instructional treatment or to control (no instruction). The teachers involved were not specifically chosen for participation in the study; rather, they represented all the teachers in the districts whose classes contained a suitable group of children. Those teachers who were assigned to the instructional treatment were asked to use the program regularly - three or four times per week - but were told that they should use the program in the way that was in their opinion most appropriate for their pupils. That is, they might skip certain objectives or even entire units, might eliminate all work sheets, and so forth. We shall obtain a complete record of how the program is utilized in each classroom.

In addition to assessing improvement on the particular skills taught in the program, we shall also assess the children's ability to use those skills in other reading situations. Thus, we shall incorporate comprehension items on the posttest. In addition, we shall interview the teachers to determine how they used the teaching strategies presented in the program in their other reading instruction.

We shall also attempt to answer the question of whether of not children can learn to transfer the decoding strategies they acquire in the program, and if so, to what extent they do so. There are very little relevant

data available. Often, small-scale laboratory-analogue studies do not demonstrate evidence of transfer, perhaps because the small amount of training usually given in such experiments is not sufficient to promote transfer. Sometimes, of course, it is a matter of inadequate design, so that what the subjects are learning is a series of rote associations and not strategies at all. There is also very little information relevant to this point based on actual classroom instruction, because it is difficult to monitor the instruction sufficiently. We are making an attempt to do this; the highly structured nature of our program makes it at least feasible to try.

DISCUSSION

A few comments on the place of research in the development of instructional programs seem in order. Although this program is research-based, it is obvious that - as in most if not all instructional development (see Venezky, 1976) - we did not have sufficient empirical data to back up all of our design decisions. Moreover, it would not be feasible nor sensible to try to collect such data. In those instances where the appropriate data were available, they did not provide conclusive evidence for the choices we had to make. One very simple example is described in this paper: our selection of the limited set of phonemes to introduce at the beginning of the program. Data were available on many of the relevant questions but were conflicting in their implications, and compromises were necessary. Thus some research findings were deliberately ignored. This is not an isolated case; indeed, it represents a substantial proportion of the decisions which were made.

It should also be noted that while programs of instruction can and must

be based on general principles of learning and cognition (and must also not run counter to common sense), more detailed and specific research findings will not ordinarily be useful in their development. For example, there was sufficient evidence five years ago that instruction should include greater focus on auditory segmentation and blending as component skills in the decoding process. A great deal of research since then has served to corroborate that fact, but the further details that have been generated by recent experiments do not themselves contribute very much to program development. More to the point as far as empirical findings are concerned are the actual outcomes of try-outs of the program itself in the field. The developer must be prepared to modify his instruction whether or not the changes seem to mesh well with findings from basic research. And he or she must, from the very beginning, design the program according to other, quite different, considerations: cost, ease of implementation, appeal, acceptability to school personnel, "fit" within the overall curriculum, and so forth. An instructional program must also be adaptable and flexible, so that it will not be put aside with the first modification of the classroom setting.

There are certain exceptions to this statement. One might be interested in determining how far and with what success certain principles apply or in demonstrating the maximum effectiveness of a particular technique. In this case, one must work within a setting that is in some sense "ideal" - and one that is certainly unusual. For example, most current computer assisted instruction requires so much special support (hardware, personnel, training, etc.) that it is ridiculous to consider that simply any school could take on such a program. But it is clearly important to find out how effective this new technology can be in instruction. In the same

way, current management systems often require a tremendous investment of time and effort on assessment. Just how valuable is it for children to be evaluated so closely and so frequently? How much energy are teachers willing to expend on assessment? Without establishing special educational settings, we shall never be able to assess the effectiveness of some of these innovative techniques and methods.

Yet it must be recognized that these special situations are far from typical. Instructional programs for today - that is, programs to be used in the schools as they actually exist, and as they will exist for the next several years - are also needed. The ABD's of Reading is one of these.

It would,of course, be highly desirable to have a comprehensive program of instruction that covers all aspects of reading studied in the early grades interfaces effectively with the rest of the school curriculum. But there are also advantages to programs that are more limited in scope, including the fact that it is easier, for individual schools or even individual teachers, to elect to use them. Moreover, in this particular instance, some teachers who would resist using a comprehensive structured approach to reading would be willing to provide supplemental instruction of this sort, thus allowing more children the opportunity of gaining the benefits of this approach.

The most important goal for a project such as this one is not that the program itself be used by large numbers of children all over the United States. One crucial goal is for some of the teaching strategies and techniques that have been developed to become, eventually, part of teachers' general repertoire of teaching skills. This general diffusion of new techniques is one of the most significant outcomes of recent federal

Research and Development efforts. Now and in the near future, we hope, The ABD's of Reading will itself be useful, because the particular aspects of the reading task that this program addresses have long been ignored in instruction. Later, however, if it is shown that this program does indeed help children to master decoding skills, those aspects of instruction that we have focused on, and those techniques which we have developed, may come to be emphasized in "regular" reading instruction, so that specific remedial instruction will not be necessary.

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June 7--Evening

OPEN DISCUSSION OF WILLIAMS PRESENTATION

GLASER: Joanna, how uniform is this need for training in these acoustic, auditory abilities? Do all of these children start out about the same level and need this kind of training, or can some of them do this very well at the beginning?

WILLIAMS: It is certainly not the case that all children need such training. We are not even working with all of the kids in the LD classrooms; I should have made that clear. I had another hand-out--do I have enough time to hand it out?

RESNICK: Yes.

WILLIAMS: It might help answer Bob's question.

Please, it's very informal data. Let me give you a simple answer to the question, and then we can look at the figures. Not all of these LD children are reading-disabled in the first place. We gave a pretest in September, and chose groups of three, four, or five in each classroom--those children that we thought ought to get this program. We found that in all cases, except one or two, the teachers who made independent determinations of which kids should go into the program matched our decisions.

The first page shows data on tasks that everybody does beautifully. We worked with 17 classes altogether, a total of 146 children. The second column shows which children we chose. We chose 63 out of those 146 to work with. On the second page are mean scores; the number in parentheses is the maximum score possible. You see that kids are pretty good on the syllable analysis and

blending; there is absolutely no problem there. If you go to the next page, and you look at the analysis of phonemes in trigrams, you find that the children are also pretty good on initial phoneme analysis and final phoneme analysis. Most programs, if they do any kind of training of analysis skill at all, will usually simply do initial phoneme and sometimes final phoneme analysis. Look across to the last column. We tested 36 second graders. These are all Title I children from the Lower East Side, West Harlem, and Central Harlem. They are presumably typical second-graders; that is, they ought to have these skills. Looking at these figures, it is dismaying when you get to the decoding scores on the last page.

Anyway, the second graders are pretty good at phoneme analysis, not bad at phoneme blending; they are different from the LD kids, and quite different from the kids whom we chose for instruction, who are a subset of those LD classrooms.

On the last page you see that the children scored fairly high on the letter-sound correspondences. That third column reports scores on "matched" children from other school districts. There was no way of doing random assignment this year, so we went to other districts and went through the same procedure of choosing groups within classes. You see that they are pretty good on letter-sound correspondences, but when it comes to decoding they are not so good.

So to answer your question, there is great diversity. I wouldn't dream of saying that every child should get this program. The program would move terribly slowly, especially in the beginning, for kids who don't need it. It's for a very low-scoring group, children who are particularly reading-disabled within a learning-disabled population.

ROSNER: Are they getting other reading instruction at the same time?

WILLIAMS: Yes. And that varies a lot. Sometimes it turns out that this program is the only instruction they are getting that's structured.

ROSNER: And this is only list reading? Do they have any stories to read, any words in the context of sentences?

WILLIAMS: Oh, I forgot to mention that. That was another thing that we were grandiose about in the beginning. In our letter-sound correspondences unit, we also decided to throw in some sight words, to learn the same simple way. Then the children could use the material in a sentence context, and would realize that the program was actually teaching them to "read." This was done partly for the kids and, frankly, partly for the teachers.

But, you know, these children don't learn sight words very easily either, and what we have decided to do, we still have little sentences, cartoon pictures, you know, and sentences under each, but we are just going to give them to the teachers. The teachers can use them as they will.

And I think what will happen, and what we will recommend, is that the teachers read everything except the words that the child can decode.

And then if any of these kids do have some sight word ability, they may very well have some low-level sight vocabulary, and just never have learned these decoding strategies, then they could read in context.

ROSNER: Why should somebody--no offense meant here--but why should somebody use this, rather than one of the structured programs that are already available?

WILLIAMS: Speaker requested that her comments be deleted.

ROSNER: I mean, what is distinctive about it?

WILLIAMS: I think what is distinctive about it is that it introduces in isolation certain component skills--segmentation and blending of phonemes--that usually are introduced only in the context of actual decoding, that is, with letters, and thus all of the visual components of the reading task. And therefore they are not mastered easily by very disabled children. Second, the program moves very slowly, and there is a whole lot of material that the teacher can use with children who need a whole lot of material. In many instances a program can be very well structured, and yet the developer leaves it to the teacher to construct more worksheets, or devise more games. In theory the teacher ought to be able to do this, but really, he can't, or if he can, he won't.

SUPPES: Do any of the children you work with have speech problems?

WILLIAMS: They are pretty normal, but there are some Spanish children in this group.

SUPPES: That's a separate problem, a bilingual one, but I mean in terms of their native language.

WILLIAMS: I don't think that they would be considered language disabled in that way.

ROSNER: By eight years old, then, you have got quite a solid spoken language facility to build on? That itself is no problem at all?

WILLIAMS: I don't think that it is.

BLOCK: Joanna, is there a planned transition for something after this program?

WILLIAMS: Not at this point, Karen.

BLOCK: I mean, not with respect to your plans, but in terms of where you see these kids going?

WILLIAMS: I see the program as a supplement. It focuses on skills that most programs, even the very structured ones, slide over rather rapidly, because most children catch on to them fairly easily. This program is for children who <u>don't</u> catch on easily even at this basic level.

RESNICK: What do you plan to use in evaluating next year?

WILLIAMS: We will develop our own test, on exactly the skills, with exactly the content, using the transfer materials that we have not used in instruction. There are a couple of comprehensive decoding tests, I would like to try one of those. I would love to be able to get some standardized reading measure. The problems of doing anything like that in the New York School System are huge. It's very, very difficult to get permission to give "tests."

RESNICK: But you would not expect relative improvement on the tests that have a

comprehension, paragraphs plus questions?

WILLIAMS: I don't know, Lauren. Not from this alone. But you could argue that if it made children more responsive to their reading instruction in the classroom, then you would see some improvement. But I am really sure that it would show up, knowing what actually happens in these classrooms with reading instruction, frankly.

GORDON: Joanna, you mentioned that this year's program, and your teacher colleagues have assumed that it's not an inappropriate load for a year, but you didn't indicate what kind of time is involved in a unit. Is it five minutes a day, or an hour, or--

WILLIAMS: Well, we said, "Do it for 10 or 15 minutes a day, four days a week, please." The mean session length was, I think, 29 minutes, with a standard deviation of something like nine minutes. The lowest was 15 minutes. One teacher used the program for something like 38 minutes a day, which is a lot of instruction in this setting.

RESNICK: So they are hungry for something structured to use.

WILLIAMS: It is very structured for the kids; it is also extremely structured for the teacher and easy to use. She just picks up at the point where she left off. We never make her look for a game two pages back, or look up anything in an index. If we have to print something 10 times, it's printed 10 times.

WALLACH: This also suggests something about how much children like to do this

kind of thing, once they are given the opportunity.

WILLIAMS: The kids seem to enjoy it.

GORDON: Do you worry about the impact of time exposed to treatment as opposed to the nature of treatment? In other words, in your contemplated evaluation, would you think that any other structured program, to which children were exposed for an average of 30 minutes a day--

WILLIAMS: It would be very helpful.

GORDON: Do you worry about the youngsters who seem to be showing unusual progress, or those that seem to be showing less than usual progress? You had dismissed earlier the efforts of individualization. And I was wondering if you were looking at the youngsters who seemed to be responding particularly to what you were doing.

WILLIAMS: We would like to, and we haven't yet. It's a matter of getting further, more difficult permission to go into what's called the confidential folders, I am sure you are familiar with that system in New York--we haven't gotten into those folders yet, and there may be something worth pursuing there. I don't think it's very simple. I certainly wouldn't try to give them a test of modality preference or anything like that. As far as our small group instruction is concerned, if kids seem to be lagging behind very much, then teachers are pretty good about just pulling those kids out and giving them some extra help on their own. We don't recommend it, but that seems to be what happens. And I am sure that's what teachers do ordinarily, with whatever instruction they are

offering.

GORDON: If you could afford to have somebody debrief those teachers, it might be informative to you to inquire about the characteristics of these special kids.

WILLIAMS: Yes. It's a good idea to probe the teachers.

HAMMOND: Do you know about how teachers relate this to the other stuff they are doing in reading or language arts, or whatever they call it?

WILLIAMS: Frankly, they don't do very much.

HAMMOND: They don't do anything?

WILLIAMS: They don't relate things very much.

HAMMOND: Have you tried to do anything about that?

WILLIAMS: No, I haven't. And that's really a good thing to try to do next year. We have not touched anything like that.

WILLIS: Are these trained special education teachers? They sound like special education classes I have seen. Reading instruction is frequently at a zero level in such classes.

WILLIAMS: They are special education teachers, and they are trained pretty well. In fact, this is one thing that's special about this year. We had wonderful luck

with our teachers, and I think it's because we were wonderfully lucky to have a really good liaison with the schools, Sidney Goldstein. He helped us choose the teachers. We have had no attrition among teachers. They vary in how enthusiastic they are, but they have all stayed with the program. And we have had attrition of only five kids out of the 64. All of this leads me to believe that those teachers are quite good, able and willing.

BECK: A concern that came up in the last conference, and even the first, Joanna, was that a very well structured, organized phonic approach is not particularly connected to the texts the students are reading in their reader. As soon as you get to letters, then I like it. Before that, a lot is lost, because there is not the connective tissue between what the student is doing here, and what he does in reading connected text.

That worries me, because I think that as soon as possible you want to provide a chance to use these words in meaningful ways.

WILLIAMS: Yes, I think that's an excellent point. I really like the idea of trying to work out ourselves some of these transfer strategies for the teacher. If the teacher can use the instructional techniques later in another context, it is good.

But I also think that whatever concepts are involved in decoding (correspondences, phoneme manipulation), that it can't help but rub off on the rest of their reading.

BECK: Yes, I agree that it will rub off, but I wonder if it will make the kind of powerful dent that it could if students could use some of these decoding

concepts immediately in connected text.

WILLIAMS: Well, Isabel, as I said, we tried. We have a very limited--

BECK: I know.

WILLIAMS: I will really take that suggestion to heart, not by putting more context in this program, but by trying to develop w[illegible]f having the teacher use some of these strategies in other contexts.

REID: We developed a reading program where we introduced all possible combinations of vowel + consonant and consonant + vowel and called them digrams, and we taught that some digrams are words, and trigrams, and some trigrams are words, and quadragrams, and some quadragrams are words, etc. We introduced vowels and consonants of every possible combination in 2, 3, 4, and 5 letter combinations.

We had lots of questions we wanted answered. One was, which is the easiest vowel sound to learn? We were able to identify it with all children (this was a learning disabled population across three school districts), that the first one introduced was the most difficult to learn, the second most difficult to learn was the second one, regardless of which short vowel sound or which long vowel sound it was.

We also controlled for rate, so that as we introduced each of the digrams and trigrams, they had to perform within a time limit. The time limit we established based upon their previous performance, so everyone had a different rate at which they had to learn. And we held them to that performance. Through

our mastery expectations, we completely changed our high responding pupils to low, and our low to high. The low students required more practice in order to master the combinations and at sustained longer practice time they performed at higher rates. So if you can visualize, your high responding students need five practices, they pass their task in, say, 26 seconds; the low, who required eight tasks at 18 seconds, so the 26-second expectation was for the high group of students and the 18 for the low. By the end of the year, and we repeated this for three years, we completely turned the tables, so that our high achieving entry students became low achieving students, and vice versa.

END SESSION